

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:  
**PATRICK J. BOHRER ET AL.**

Serial No.: **09/965,013**

Filed: **SEPTEMBER 27, 2001**

For: **CONSERVING ENERGY IN A  
DATA PROCESSING NETWORK**

§ Attorney Docket No.  
§ **AUS920010312US1**

§ Examiner: **BENJAMIN A. AILES**

§ Confirmation No.: **2760**

§ Art Unit: **2142**

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**THIRD RESPONSE TO NOTIFICATION OF NON-COMPLIANT  
APPEAL BRIEF UNDER 37 C.F.R. 41.37**

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Sir:

This Appeal Brief is submitted in response to a Notification of Non-Compliant Appeal Brief mailed on June 22, 2007, for the Appeal Brief filed on December 1, 2006. In this Revised Appeal Brief, the summary of the claimed subject matter has been revised to include a concise summary of the subject matter of Claim 21. In addition, the notation of claims as canceled has been removed from the claims appendix.

No fee is required to file this Compliant Appeal Brief as the fee for filing the original Appeal Brief was paid at submission. However, should any fees be required to file this Compliant Appeal Brief, please charge that fee, as well as any additional required fees, to **IBM Deposit Account No. 09-0447**.

### **REAL PARTY IN INTEREST**

The real party in interest in the present Application is International Business Machines Corporation, the Assignee of the present application as evidenced by the Assignment set forth at reel 012229, frame 0204.

### **RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences known to Appellants, the Appellants' legal representative, or assignee, which directly affect or would be directly affected by or have a bearing on the Board's decision in the pending appeal.

### **STATUS OF CLAIMS**

Claims 1, 4-7, 10-15, and 18-23 stand finally rejected by the Examiner as noted in the Final Office Action dated June 15, 2006. Claims 2, 8 and 16 were canceled in an Amendment filed May 16, 2005. Claims 3, 9 and 17 were canceled in an Amendment filed December 5, 2005. The rejections of Claims 1, 4-7, 10-15, and 18-23 are appealed.

### **STATUS OF AMENDMENTS**

No amendments to the claims have been made subsequent to the final rejection that leads to this appeal.

### **SUMMARY OF THE CLAIMED SUBJECT MATTER**

As recited by Appellants' independent Claim 1, Appellants' invention provides a method of operating a data processing network. As is illustrated, *inter alia*, at Figure 4, reference number 402 and described at page 6, line 12 *et seq.*, the method includes performing an initial negotiation between a server of the network and a switch to which the server is connected, wherein the initial negotiation establishes an initial operating frequency of a link between the server and the switch. As is illustrated, *inter alia*, at Figure 4, reference number 404 and described at page 6, line 15 *et seq.*, the method further includes determining an effective data rate of the server based on network traffic communicated over the link. As is illustrated, *inter alia*, at Figure 4, reference number 410 and described at page 7, line 20 *et seq.*, the method also includes, responsive to determining that the effective data rate is below the capacity of a current

bandwidth of the link, performing a subsequent negotiation to establish a modified operating frequency, wherein the modified operating frequency is closer to the effective data rate than the initial operating frequency. As is illustrated, *inter alia*, in Figure 4, and described at page 8, line 3 *et seq.*, automatic repetition, at specified intervals during the operation of the network, of the determination of the effective data rate and the contingent initiation of a subsequent negotiation to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate, is performed.

As recited by Appellants' independent Claim 7, Appellants' invention provides a data processing network. As is illustrated, *inter alia*, at Figure 2, reference number 110 and described at page 4, line 10 *et seq.*, the network includes a central switch. As is illustrated, *inter alia*, at Figure 2, reference number 111 and described at page 4, line 13 *et seq.*, the network includes a server device including a processor, memory, and a network interface card connecting the server device to the central switch via a link. As is illustrated, *inter alia*, at Figure 4, reference number 402 and described at page 6, line 12 *et seq.*, the network includes code means for performing an initial negotiation, wherein the initial negotiation establishes an initial operating frequency of the link. As is illustrated, *inter alia*, at Figure 4, reference number 404 and described at page 6, line 15 *et seq.*, the network further includes code means for determining an effective data rate of the server based on network traffic transmitted over the link. As is illustrated, *inter alia*, at Figure 4, reference number 410 and described at page 7, line 20 *et seq.*, the network also includes code means for performing a subsequent negotiation to establish a modified operating frequency responsive to determining that the effective data rate is different than a current bandwidth of the link, wherein the modified operating frequency is the lowest operating frequency accommodated by the link that is sufficient to handle the effective data rate. As is illustrated, *inter alia*, in Figure 4, and described at page 8, line 3 *et seq.*, the network additionally includes code means for automatically repeating, at specified intervals during the operation of the network, the determination of the effective data rate and the contingent initiation of a subsequent negotiation to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate.

As recited by Appellants' independent Claim 15, Appellants' invention provides a server device suitable for use in a server cluster. As is illustrated, *inter alia*, at Figure 3, reference number 140 and described at page 5, line 11 *et seq.*, the server includes at least one processor, and, as is illustrated, *inter alia*, at Figure 3, reference number 143 and described at page 5, line 9 *et seq.*, the server includes a system memory accessible to the processor. As is illustrated, *inter alia*, at Figure 3, reference number 121 and described at page 5, line 9 *et seq.*, the server includes a network interface card configured to connect the server device to a central switch over a link. As is illustrated, *inter alia*, at Figure 4, reference number 402 and described at page 6, line 12 *et seq.*, the server includes code means for performing an initial negotiation, wherein the initial negotiation establishes an initial operating frequency of the link. As is illustrated, *inter alia*, at Figure 4, reference number 404 and described at page 6, line 15 *et seq.*, the server further includes code means for determining an effective data rate of the server based on network traffic transmitted over the link. As is illustrated, *inter alia*, at Figure 4, reference number 410 and described at page 7, line 20 *et seq.*, the server also includes code means for performing a subsequent negotiation to establish a modified operating frequency responsive to determining that the effective data rate is different than a current bandwidth of the link, wherein the modified operating frequency is the lowest operating frequency accommodated by the link that is sufficient to handle the effective data rate. As is illustrated, *inter alia*, in Figure 4, and described at page 8, line 3 *et seq.*, the server additionally includes code means for automatically repeating, at specified intervals during the operation of the network, the determination of the effective data rate and the contingent initiation of a subsequent negotiation to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate.

Independent Claim 21 recites a computer program product including computer executable instructions, stored on a computer readable medium (see, e.g., Figure 3, memory 143; page 5, lines 26-30), for conserving energy in a data processing network having a switch, a server, and a link connecting the switch to the server. The instructions include instructions for detecting that the link is underutilized including instructions for determining that a capacity of a current bandwidth of the link is greater than an effective data rate of the link (see, e.g., Figure 4, block 406; page 7, lines 11-14). The instructions also include instructions for responding to said

detecting by reducing an operating frequency of the link (see, e.g., Figure 4, block 410; page 7, line 20 *et seq.*). The instruction further include instructions for automatically repeating, at specified intervals, said instructions for detecting and said instruction for responding to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate (see, e.g., Figure 4, process repetitively returning to block 404; page 8, line 3 *et seq.*).

## **GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

- I. The Examiner's rejection of Claims 1, 4-7, 10-15, and 18-23 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,876,668 to Chawla *et al.* (*Chawla*) in view of U.S. Patent No. 6,292,834 to Ravi *et al.* (*Ravi*) is to be reviewed on appeal.

## **ARGUMENT**

- I. **The Examiner's rejection of Appellants' Claim 1 as unpatentable over Chawla in view of Ravi should be reversed because the combination of references does not disclose all elements of Applicants' exemplary Claim 1.**

As discussed by Appellants with the Examiner in a telephone interview on July 27, 2006 (the substance of which interview is contained herein), the Examiner has rejected exemplary Claim 1. With respect to exemplary Claim 1, and by extension to Claims 4-7, 10-15, and 18-23, Appellants respectfully submit that the Examiner's proposed combination of *Chawla* and *Ravi* does not render Appellants' invention obvious because the proposed combination of references does not disclose all features of Appellants' invention for which it is cited.

- A. **The proposed combination of Chawla and Ravi does not disclose "determining an effective data rate of the server based on network traffic communicated over the link".**

Appellants' Claim 1, as well as independent Claims 7 and 15, recite "determining an effective data rate of the server based on network traffic communicated over the link". The Examiner cites col. 12, line 61 – col. 13, line 4 of *Chawla* as teaching "determining an effective data rate of the server based on network traffic communicated over the link". The cited text of columns 12 and 13 states:

Continuing with the example, the bandwidth reservation processor **500** in each device **201-B** through **201-E** receives the RSVP path and bandwidth reservation request messages. If the bandwidth reservation processor **500** determines that a requesting application or host (e.g., receiving hosts **210-A2** or **210-A3**) has permission or privileges to reserve the requested bandwidth (e.g., RSVP policy control) and also determines that the requested resource (e.g., the 100 Kbps bandwidth) is available in the device **201**, the bandwidth reservation processor **500** in each data

communications device **201-B** through **201-E** grants the request and establishes the 100 Kbps bandwidth reservation for the "A" data stream **203** along the path from sending host **210-A1** to receiving hosts **210-A2** and **210-A3**.

Appellants respectfully submit that the cited text of *Chawla* fails to teach or suggest "determining an effective data rate of the server based on network traffic communicated over the link", which is illustrated, *inter alia*, at **Figure 4**, reference number **404** and described at page 6, line 15 *et seq.* Instead, the cited portion of *Chawla* discloses only an initial *negotiation based on availability*, rather than "*determining an effective data rate of the server based on network traffic communicated over the link*". Alternatively stated, *Chawla* discloses an attempt to reserve network capacity, to the extent that it is available, while Appellants' Claim 1 recites a determination of the actual capacity initially being utilized by the server. To assert that the selected passage of *Chawla* teaches or suggests "*determining an effective data rate of the server based on network traffic communicated over the link*" is analogous to arguing that the act of seeking a reservation for a seat on an airplane is equivalent to the act of entering the plane and determining the presence of an occupant in a seat. The combination of *Ravi* and *Chawla* thus discloses a theoretical allocation of what bandwidth should be available, while Appellants' Claim 1 recites determining the bandwidth that is actually used.

Because the recited feature of "*determining an effective data rate of the server based on network traffic communicated over the link*" is not disclosed by the combination of *Chawla* and *Ravi*, the Examiner has not articulated a *prima facie* case of obviousness under 35 U.S.C § 103(a). In the absence of such a *prima facie* case, the Examiner's rejection of exemplary Claim 1, similar Claims 7 and 15, and all claims depending from them should be reversed.

The rejection of independent Claim 21 and its dependent claims should be reversed for the same reasons in that Claim 21 recites "instructions for detecting that the link is underutilized including instructions for determining that a capacity of a current bandwidth of the link is greater than an effective data rate of the link," which likewise entails a determination of the actual data rate of the link.

B. The proposed combination of Chawla and Ravi does not disclose “responsive to determining that the effective data rate is below the capacity of a current bandwidth of the link, performing a subsequent negotiation to establish a modified operating frequency, wherein the modified operating frequency is closer to the effective rate than the initial operating frequency”.

Appellants' Claim 1, as well as independent Claim 7 and Claim 15 recite “responsive to determining that the effective data rate is below the capacity of a current bandwidth of the link, performing a subsequent negotiation to establish a modified operating frequency, wherein the modified operating frequency is closer to the effective rate than the initial operating frequency”, which is illustrated, *inter alia*, at **Figure 4**, reference number **410** and described at page 7, line 20 *et seq.* The proposed combination of *Chawla* and *Ravi* does not disclose this recited feature. The Examiner cites *Chawla* at Col. 13, lines 20–24 as disclosing the foregoing feature of exemplary Claim 1. The cited text states:

If a video client application (not shown) executing on recipient host **210-A3** senses that more network bandwidth is required (such as **120** Kbps) to effectively receive the "A" video data stream **203**, the host **210-A3** can use RSVP to make a bandwidth reservation request (not shown) containing bandwidth allocation adjustment information to each network device **201-E**, **201-D**, **201C** and **201-B**.

Appellants respectfully submit that “*a video client application ... executing on recipient host 210-A3 sens[ing] that more network bandwidth is required ... to effectively receive the ‘A’ video data stream*” does not disclose “performing a subsequent negotiation to establish a modified operating frequency, wherein the modified operating frequency is closer to the effective rate than the initial operating frequency”. The determination taught by *Chawla* centers on whether the application ‘needs’ additional bandwidth, but does not disclose modifying the available bandwidth to meet the effective rate of actual capacity utilization of the link. This difference in the purpose and function is so great that one skilled in the relevant art would not be motivated by the ‘needs’ determination taught in the proposed combination of *Chawla* and *Ravi* to additionally perform the step recited in Appellants’ exemplary Claim 1.

Because the recited feature of “responsive to determining that the effective data rate is below the capacity of a current bandwidth of the link, performing a subsequent negotiation to establish a modified operating frequency, wherein the modified operating frequency is closer to the effective rate than the initial operating frequency” is not disclosed by the combination of *Chawla* and *Ravi*, the Examiner has not articulated a *prima facie* case of obviousness under 35 U.S.C § 103(a). In the absence of such a *prima facie* case, the Examiner’s rejection of Claim 1, similar Claims 7 and 15, and all claims depending from them should be reversed. The rejection of independent Claim 21 and its dependent claims should similarly be reversed because the combination of *Chawla* and *Ravi* does not disclose “reducing an operating frequency of the link,” but instead as noted above discloses an attempt to reserve more network bandwidth.

## II. Conclusion

Appellants have pointed out with specificity the errors in the Examiner's rejections, and the claim language that renders the invention patentable over the combination of references. Appellants therefore respectfully request that the rejection of all pending claims be reversed.



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## **APPENDIX**

1. A method of operating a data processing network, comprising:

performing an initial negotiation between a server of the network and a switch to which the server is connected, wherein the initial negotiation establishes an initial operating frequency of a link between the server and the switch;

determining an effective data rate of the server based on network traffic communicated over the link; and

responsive to determining that the effective data rate is below the capacity of a current bandwidth of the link, performing a subsequent negotiation to establish a modified operating frequency, wherein the modified operating frequency is closer to the effective data rate than the initial operating frequency;

automatically repeating, at specified intervals during the operation of the network, the determination of the effective data rate and the contingent initiation of a subsequent negotiation to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate.

4. The method of claim 1, wherein the initial and subsequent negotiation are compliant with the IEEE 802.3 standard.

5. The method of claim 1, wherein determining the effective data rate includes accumulating information indicative of the amount of network traffic during a specified interval and calculating an effective data rate based thereon.

6. The method of claim 1, further comprising, responsive to determining that the effective data rate is greater than a specified percentage of the current bandwidth, performing a subsequent negotiation to establish a modified operating frequency, wherein the modified operating frequency is higher than the current operating frequency.

7. A data processing network, comprising:

a central switch;

a server device including a processor, memory, and a network interface card connecting the server device to the central switch via a link;

code means for performing an initial negotiation, wherein the initial negotiation establishes an initial operating frequency of the link;

code means for determining an effective data rate of the server based on network traffic transmitted over the link;

code means for performing a subsequent negotiation to establish a modified operating frequency responsive to determining that the effective data rate is different than a current bandwidth of the link, wherein the modified operating frequency is the lowest operating frequency accommodated by the link that is sufficient to handle the effective data rate; and

code means for automatically repeating, at specified intervals during the operation of the network, the determination of the effective data rate and the contingent initiation of a subsequent negotiation to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate.

10. The network of claim 7, wherein the initial and subsequent negotiation are compliant with the IEEE 802.3 standard.

11. The network of claim 7, wherein the code means for determining the effective data rate includes code means for accumulating information indicative of the amount of network traffic during a specified interval and calculating an effective data rate based thereon.

12. The network of claim 7, further comprising, code means for performing a subsequent negotiation to establish a modified operating frequency responsive to determining that the effective data rate is greater than a specified percentage of the current bandwidth, wherein the modified operating frequency is higher than the prior operating frequency.

13. The network of claim 7, wherein the initial and subsequent negotiations are initiated by the central switch.

14. The network of claim 7, wherein the initial and subsequent negotiations are initiated by the server device.
15. A server device suitable for use in a server cluster, comprising:
  - at least one processor;
  - a system memory accessible to the processor;
  - a network interface card configured to connect the server device to a central switch over a link;

code means for performing an initial negotiation, wherein the initial negotiation establishes an initial operating frequency of the link;

code means for determining an effective data rate of the server based on network traffic transmitted over the link; and

code means for performing a subsequent negotiation to establish a modified operating frequency responsive to determining, that the effective data rate is different than the current bandwidth of the link, wherein the modified operating frequency is the lowest operating frequency accommodated by the link that is sufficient to handle the effective data rate;

code means for automatically repeating, at specified intervals during the operation of the network, the determination of the effective data rate and the contingent initiation of a subsequent negotiation to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate.
18. The server device of claim 15, wherein the code means for determining the effective data rate includes code means for accumulating information indicative of the amount of network traffic during a specified interval and calculating an effective data rate based thereon.
19. The server device of claim 15, further comprising, code means for performing a subsequent negotiation to establish a modified operating frequency responsive to determining that the effective data rate is greater than a specified percentage of the current bandwidth, wherein the modified operating frequency is higher than the prior operating frequency.

20. The server device of claim 15, wherein the network interface card includes a clock unit configured to provide a clocking signal that controls the link operating frequency, and further wherein the code means for establishing the modified operating frequency includes code means for programming a clock register that controls the frequency of the clocking signal.

21. A computer program product comprising computer executable instructions, stored on a computer readable medium, for conserving energy in a data processing network having a switch, a server, and a link connecting the switch to the server, the instructions comprising:

instructions for detecting that the link is underutilized including instructions for determining that a capacity of a current bandwidth of the link is greater than an effective data rate of the link;

instructions for responding to said detecting by reducing an operating frequency of the link; and

instructions for automatically repeating, at specified intervals, said instructions for detecting and said instruction for responding to automatically and periodically modify the operating frequency to a lowest operating frequency compatible with the effective data rate.

22. The computer program product of claim 21, further comprising instructions for determining the effective data rate of the link, wherein the effective data is indicative of an amount of data traversing the link during a specified interval.

23. The computer program product of claim 22, further comprising:

instructions for detecting that the link is over-utilized include instructions for determining that a current bandwidth of the link is less than an effective data rate of the link; and

instructions for responding to said detecting that the link is over-utilized by increasing an operating frequency of the link.

**EVIDENCE APPENDIX**

Other than the Office Action(s) and reply(ies) already of record, no additional evidence has been entered by Appellants or the Examiner in the above-identified application which is relevant to this appeal.

**RELATED PROCEEDINGS APPENDIX**

There are no related proceedings as described by 37 C.F.R. §41.37(c)(1)(x) known to Appellants, Appellants' legal representative, or assignee.